CITRUS ADVANCED TECHNOLOGY PROGRAM

QUARTERLY & FINAL REPORTS: Control of Citrus Greening, Canker & Emerging Diseases of Citrus

SELECT PERIOD March 2014

(●) *Quarterly Report* ( ) *Final*

Proposal Title

Low-cost solar Thermal treatment for in-grove reduction of CLas inoculum

Today's Date	Sponsoring Organization (drop-down)	Category (drop down)
5/6/14	Citrus Research and Development Foundation	Unclassified

REPORT UPDATE (500 words-It is not necessary in this public report to disclose your institution's proprietary information or intellectual property.)

During August and September 2013, three locations (Pico's Farm, Evan's Properties, and Blue Goose Groves) were selected for the thermotherapy trial. Roughly 30 HLB-affected Valencia trees were chosen using a random block design at each of the locations. Trees were either subjected to no heat or tented for 96 hours which included 4 full afternoons of summer heat. In late November and December, trees were sampled for 3 months post heat treatment data. Trees were sampled again in March and April 2014 for 6 months post heat treatment data. Trees at Pico's farm and Blue Goose's properties were in the process of spring flushing and blossoming. Heated trees had an increase in canopy density. Despite the presence of spring flush, untreated trees were not dramatically thicker. Tree height had no change. Fruit crop was counted. The spring 2014 crop will be compared to spring 2015 crop to understand how thermal therapy affects fruit production, fruit drop, and fruit quality. Leaves were collected and processed to determine the Las titer in specific branches before and after treatment. The trees at Evan's Properties were 15 years old. Before treatment, the Evan trees had very thin canopies with a large crop of fruit. During the spring sampling period, it was noticed that the heat treated trees contained a dramatic amount of new tender flush. Trees continue to look a bit sparse but there were definite improvement of canopy growth in some regions of the tree canopy observed when comparing photos of trees before and after heat treatment. Evan's trees were slightly shorter after heat treatment as that the tops of the trees were burnt during treatment. Fruit crop was also counted at this location. Leaves from specific marked branches were collected. At this time, all samples from before treatment and 3 and 6 months later have been processed and analyzed for Las titer. Student t-test and Tukey's test will be used to determine if changes in Las cells/gram of tissue is statistically less after treatment for each time period, as compared between treated and untreated, and between sites. The nine month sampling begins in mid-May 2014.

During Spring 2014, a new heat treatment system was developed incorporating a steam generator. A retractable tent was mounted to the side of a fruit hauling truck (Goat truck). The accordion style tent is hydraulically controlled to ease the process of moving from tree to tree. The steam generator along with the electric generator and water tank were mounted into the bed of the truck. A hose is fitted from the steam generator to the side of the goat trailer so that the hose can be placed in the desired position on the ground before the tent is lowered over the tree. A series of trees have been treated at 55C for 1 to 20 minutes. The main objective of these tests was focused on learning the appropriate treatment time and temperature that will not permanently damage young trees. Preliminary results on young small trees (5-6 feet tall) suggested that 10 minutes or higher treatment duration with steam is too harsh for the tree to recover and will kill the tree. The time range was reduced to between 1 and 4 minutes based on tree size and temperature. The temperature around the tree canopy should not exceed 130 °F. It was also noticed that placing the outlet of the hose directly against the base of the tree causes too much damage and was later moved to a position in which the hose outlet was facing the tent instead of the tree.

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